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PERFORMANCE TEST OF U. S. MAIL DH-M2

(PERFORMANCE TEST REPORT No. 89)



Prepared by Engineering Division, Air Service
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(2)

OFFICIAL PERFORMANCE TEST OF U. S. MAIL, DH-M2.

SUMMARY OF RESULTS.

Date, May 5, 1922.

Airplane, U. S. Mail. No. 255.

Type, DH-M2. Engine, Liberty "12."

Propeller, Dwg. No. 34555. Equipped as mail plane.

	Pounds.
Weighty empty (including water).....	3, 190
Armament and equipment (600 pounds ballast in mail pit).....	633
Crew.....	180
Gasoline.....	653
Oil.....	56
Weight loaded.....	4, 712

Weight (square foot), 9.4 pounds (500 square feet).

Weight (horsepower), 11.35 pounds (415 horsepower at 1,750 R. P. M.).

Fineness, 103.8; Ae 14.5.

Standard altitude in feet.	Climb.			Speed.		
	Time in minutes.	R. P. M.	Rate (feet) in minutes.	M. P. H.	R. P. M.	Flow (gallons per hour).
0.....		1, 570	900	121. 7	1, 750	
6, 500.....	9. 03	1, 535	560	117. 8	1, 695	
10, 000.....	16. 5	1, 540	380	114. 0	1, 650	
15, 000.....	38. 2	1, 505	130	104. 0	1, 550	
20, 000.....						
25, 000.....						
15, 500 service ceiling.....	42. 7	1, 500	100	101. 7	1, 535	
17, 400 absolute ceiling.....		1, 480	0	83. 5	1, 480	

Endurance, full throttle at 10,000 feet (including climb), 4½ hours.

Minimum speed at sea level (lowest throttle), 63.3.

Landing speed, 59.9 M. P. H.

DISTRIBUTION OF WEIGHTS.

	Pounds.
Weight empty (with water).....	3, 190
Armament and equipment (600 pounds ballast in mail pit).....	633
Crew.....	180
Gasoline.....	653
Oil.....	56
Weight loaded.....	4, 712
Weight on front wheels (tail skid on ground).....	4, 144
Weight on tail skid (tail skid on ground).....	568
Weight on front wheels (flying position).....	4, 351
Weight on tail skid (flying position).....	361

Center of gravity (distance from wheels in flying position), 16.8 in aft of center line of axle.

Provisions for special equipment not carried during test.

PILOT'S OBSERVATIONS.

FLYING QUALITIES.

Taxying: Easy to taxi.

Take-off: Response to controls good. Takes off easily with the usual run for this type.

Landing: Easy and slow. No tendency to spin on the ground. Very good glide.

Stability: Lateral; very good. Longitudinal; adjustable stabilizer O. K. Stalls very slowly, but on stalling falls off to the left slowly.

Maneuverability: Ease of control, good. Response to control, good. Handles easily in maneuvers for this type. Holds steep banks well and turns within a short radius. Do not recommend this airplane for any stunting whatever.

VISIBILITY.

O. K. except forward and downward; the visibility is cut off by the lower wing, making it a little difficult in a forced landing.

MAINTENANCE.

This airplane, during the time flown on test, gave very little maintenance trouble. Recommend the engine mounting be strengthened, as well as the center section fittings, struts and cables. Recommend gas system be changed to syphon pump or wind-driven pump.

SUMMARY.

The flying qualities of this airplane are very good, having plenty of reserve climb and stalling very slowly.

The wheel is too large, which results in the cockpit being very crowded. Recommend a smaller control wheel be used. The pilot's seat could also be changed to give the pilot more comfort.

DESCRIPTION OF POWER PLANT.

ENGINE.

Make, Liberty. Factory, No. 1716. A. S. No. 31315. Type, 12 cylinder, vertical 45°. Number in plane, 1. Location, front of fuselage. Rated horsepower, 400. Rated revolutions per minute, 1,700. Bore, 5 inches. Stroke, 7 inches. Compression ratio, 542 to 1. Weight dry, 845 pounds. Gas consumption, 0.496 pound horsepower per hour. Oil consumption, 0.032 pound horsepower per hour. Weight of water in engine, 45 pounds.

IGNITION.

Battery or magneto, battery. Make, Delco. Number, ———. Advance, degrees, 30°. Gas interrupter, ———.

Distributor, ———. Plugs: Make, B. G. Type, metal body, porcelain insulation. Gap, 0.020.

CARBURETORS.

Make, Zenith. Type, double jet, double venturi. Number, 2. Setting jet, 1.65 m/m. Choke, 36 m/m. Compensator, 1.70 m/m. Gas drains, $\frac{3}{8}$ tubing leading out of fuselage. Air intake, straight scoop. Mixture control, manual operated.

RADIATORS.

Make, B. Type, ribbon core. Number, 1. Position, nose of fuselage. Frontal area, 5.9. Depth, 5 inches. Length, 49 inches. Width, 29 inches. Radiator surface, 312 square feet. Temperature adjustment, shutters. Water capacity, 81 pounds. Flow, satisfactory. Thermometer: Make, Boyce. Weight, 179 pounds, full. Type, ———. Water capacity of whole system, 131 pounds. Allows full climb without boiling when temperature is approximately 75–80° F.

EXHAUST PIPES.

Description, individual stocks for each cylinder merging into manifold for each bank.

LUBRICATION.

Capacity oil tank, 7 gallons. Dimensions oil tank ———. Oil used (brand), Liberty. Oil pressure, 34. Oil temperature, no oil thermometer. Type pump, gear. Wet or dry sump, dry. If wet, capacity ———. Description lubrication system: Force feed to all main bearings, connecting rods, and cam shafts, spray to cylinder walls and wrist pins.

FUEL SYSTEM.

Number of tanks: 1 main; 1 gravity. Location, between mail compartment and cockpit. Capacity, main pounds, 103 gallons. Capacity, reserve pounds, 9 gallons. Material, terne plate. Gauge, 18. Description of fuel-supply system, air-pressure system.

ENGINE CONTROL.

Description, rod and lever.

PROPELLER.

Make, Engineering Division. Number blades, 2. Diameter, 9 feet 2 inches. Pitch 6.98'. Tips, terne plate. Clearance, ———. Dwg. No. 34555. A. S. No. 74608.

DESCRIPTION OF AIRPLANE.

DIMENSIONS.

Overall span, 48 feet 8 inches.
Overall length, 30 feet 2½ inches.
Overall height, 11 feet 5 inches.
Height at hub of propeller above ground ———.
In flying position, ———.
At rest, ———.

AIRPLANES.

Wing curve, R. A. F. 15.
Sweepback, none.

Dihedral, degrees, 3°.

Stagger, 8 inches.

Total area including ailerons, ———.

Gap, 5 feet 6 inches.

UPPER PLANE.

(Including center section.)

Span, 48 feet 8 inches.

Chord, 5 feet 6 inches.

Area, with ailerons: Total upper and lower, 500 square feet.

Incidence, degrees, 3°.

LOWER PLANE.

Span, 48 feet 8 inches.

Chord, 5 feet 6 inches.

Area, see above.

Incidence, degrees, 3°.

AILERONS OR FLAPS.

Number, 4.

Arrangement, ———.

Upper length, ———.

Upper chord, ———.

Upper area, 36.6.

Lower length, ———.

Lower chord, ———.

Lower area, 36.6.

Total area, 73.2.

Distance from center of ailerons to longitudinal axis of airplane, ———.

CENTER SECTION.

Area, ———.

Dimensions, ———.

Contents, ———.

STABILIZER.

Area, 37.2 square feet.

Setting, ———.

ELEVATOR.

Area, 23.6 square feet.

Distance from leading edge of elevator to center of gravity of airplane, ———.

RUDDER.

Area, 15.8 square feet.

Distance from leading edge of rudder to center of gravity of airplane, ———.

FUSELAGE.

Maximum cross-section shape, ———.

Maximum cross-section area, ———.

Maximum cross-section dimension, ———.

Distance of maximum section from leading edge, lower plane, ———.

LANDING GEAR.

Number of wheels, ———.

Tread, ———.

Shock-absorbing system, ———.

Braking device, ———.

Wheels ahead of center of gravity, ———.

FIN.

Area, 5.6 square feet.

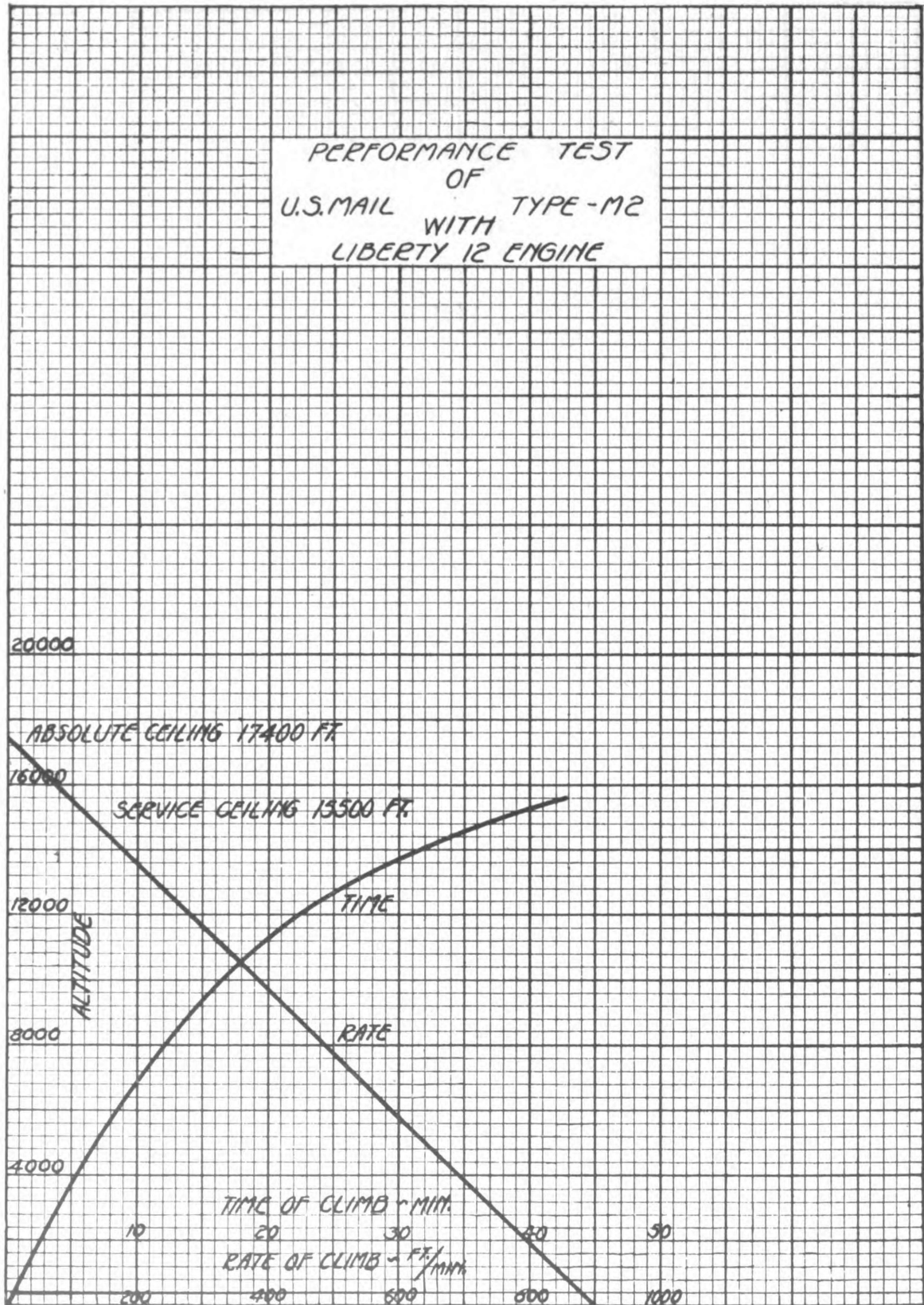


FIG. 1.

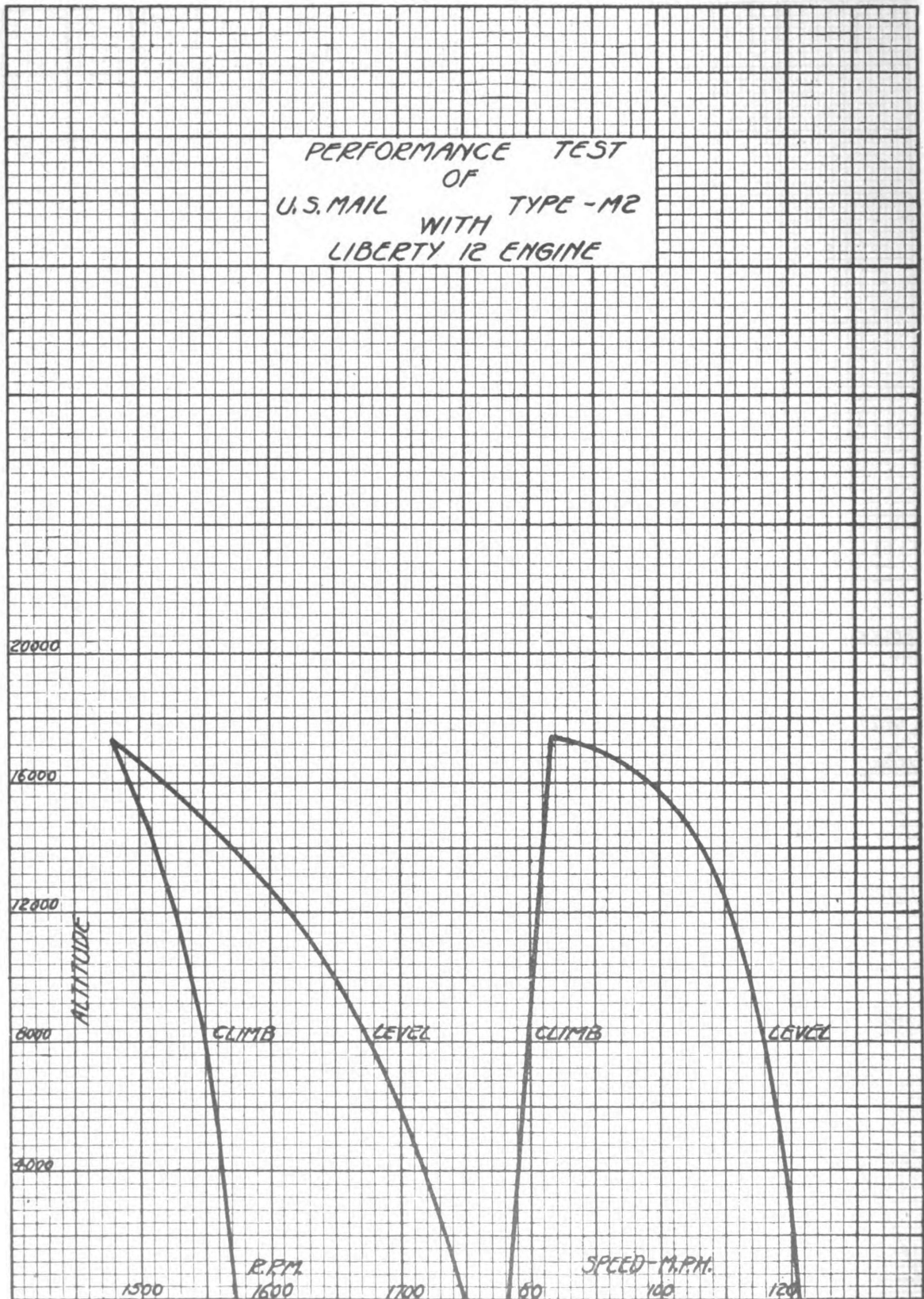


FIG. 2.



FIG. 3.



FIG. 4



FIG. 5.